BOTANICAL GAZETTE.

Vol. IV. APRIL, 1879. No. 4.

OPHIOGLOSSUM PALMATUM, Linn.—A habitant of tropical America from Cuba to South Brazil, and also of the Isle of Bourbon in the Old World, this species was first detected within the limits of the United States by Dr. Chapman, and was published in his enumeration of new plants from the semi-tropical regions of Florida (BOTAN. GAZETTE, Vol. III, p. 20). It does not appear to have been met with by Dr. Garber, Mr. Curtiss, Mr. Shockley and others, whose recent collections in East and South Florida have added many species to the list of North American Ferns, and have verified to some extent the prediction, that the Everglades, if ever thoroughly explored, would contribute largely to our *Cryptogamiæ*.

It was my good fortune, in March, 1878, to come across *O. palmatum;* and the interest in finding it was enhanced by the fact that its discovery by Dr. Chapman had not at that time been published. The plant is probably quite rare, at least north of lat. 20 degrees, 40 minutes. In the course of an extended trip along the Gulf Coast region from Cedar Keys to Charlotte Harbor, and up the Caloosahatchee River, ninety miles, to its source near Lake Okeechobee, I observed this *pseudo* Fern in only one spot: a Palmetto swamp about a mile back from the north bank of the Caloosahatchee, some sixty miles above Punta Rasa, and about eight miles west-north-west from the old site of Fort Simmons. The locality seemed to offer no peculiar conditions, beyond the fact that it exhibited no traces of having been visited by fires. The only specimens found grew upon two *Sabal Palmetto* trees, fifteen to twenty feet from the ground, rooted in the axils and under the sheaths of the dead petioles—much after the manner of another epiphytal, a true Fern common in those parts, *Polypodium aureum*.

Omitting the characters of this species to be found in the descriptions of authors, the following details, chiefly supplemental, are taken from my specimens; and it is to be noted, that these are in every way smaller, and have fewer lobes and spikes, than the specimens described or figured from more tropical countries:

Rhizome thick, fern-like, producing 1–3 fronds, mostly without fruit; same root-stock sometimes bearing a persistent dead frond, a

green one with withered spikes of empty sporangia, another one with matured fruit, and a minute young frond; rootlets profuse, stout, forking dichotomously. Sterile segment undulate, divisions 1–4, sometimes forking once or twice, acutish, pendulous, sinuses wrinkled or plicate. Fertile segments or "spikes" 1–4, arising at intervals or clustered from the stipe, the basal margins, or the intramarginal lamina near the base of the sterile segment, recurved; peduncles 6 lines long, spikes 6 lines to one inch long and one line broad; sporangia 14–20 pairs.

The external structure of the frond in this species as also in *O. pendulum*, indicates the unity of the barren and fertile parts in *Ophioglossaceæ*, and that together they constitute a "branched leaf." (Sachs) This theory is in opposition to the earlier hypothesis of a cohesion of the two spikes of a barren and of a fertile frond. In *O. palmatum*, therefore, the highly developed frond may be described as branching into one barren, and numerous fertile, segments; the former again dividing into dichotomously forking lobes.

Branching thus like the horns of elks, and thick and fleshy in texture while living, this curious epiphyte has probably recalled to others as well as myself, the exotic Fern, which is often seen attached to the wall of conservatories, *Platycerium alcicorne*.

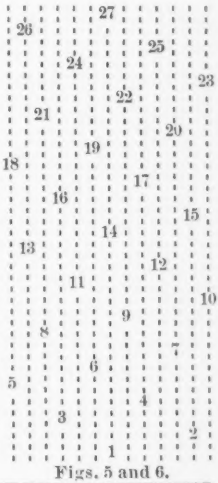
The species is so distinct from all its congeners, that Presl founded upon it a separate genus, which he called *Cheiroglossum*, in allusion to the resemblance of the sterile segment to a *hand*, and of the fertile ones to *tongues*.—JOHN DONNELL SMITH.

PHYLLOTAXY OF LEAVES, by A. P. Morgan (concluded from Feb. GAZETTE).—15. The secondary spirals are of essential service in determining the arrangement of the leaves when they are thickly crowded upon the stem, as is the case with the leaves of the Houseleek and the scales of Pine Cones. The intermediate spirals are the most plainly to be seen; those adjacent to the vertical ranks and to the primary spiral are the most obscure. Having determined two consecutive orders of spirals, one winding to the right and the other winding to the left, the sum of their numbers of spirals gives the next higher order of spirals. and their difference gives the next lower order. The other orders of spirals may be determined in like manner until the primary generating spiral and the vertical ranks are reached.

16. A single example will illustrate the manner of finding the cycle by means of the secondary spirals. Take for example the cone of the White Pine (*Pinus Strobus*) (Figs. 5 and 6). The process of

finding the cycle may be divided into three parts.

I. *To mark the numbers upon the scales.* If we trace one set of spirals plainly to be seen winding to the right, we find they consist of three parallel lines of scales extending from the base to the apex of the cone. This gives us the common difference 3 (14. e.). In like manner from a set of spirals winding to the left, we get the common difference 5. Marking the lowest scale 1, we set off from it in one direction the series 1, 4, 7, 10, &c., and in the other direction the series 1, 6, 11, 16, &c. Then from 4, 7, 10, 13 as starting points, with the common difference 5, we mark parallel with 1, 6, 11, &c., the series of scales, 4, 9, 14, &c., 2, 7, 12, &c., 5, 10, 15, &c., and 3, 8, 13, &c. This numbers all the scales of the cone.



Figs. 5 and 6.

II. *To find the denominator of the cycle.* The number of the spirals in the two consecutive orders is 3 and 5; hence the number of spirals in the next higher order is 3x5=8 (14. c.). This order therefore consists of eight spirals parallel with 1, 9, 17, 25, &c. The sum of 5 and 8 is 13 and an inspection shows that the series 1, 14, 27, 40, &c., belongs to a vertical rank. There are therefore 13 vertical ranks, and the denominator of the cycle is 13.

III. *To find the numerator of the cycle.* If we trace the primary generating spiral 1, 3, 4, 5, &c., from the scale marked 1, we find that it makes 5 turns around the cone to reach the scale marked 14. This gives the numerator 5. Therefore the cycle is 5-13.

17. That the cycle of the cone belongs to the common system (0–1, 1–2, etc.) may be inferred from the number of spirals in the successive orders being 3, 5, 8, 13, (14. b. c.). The numerator 5 of the cycle may also be inferred from the second order of spirals preceding the vertical rank. The numerator of any cycle in the common system is always the same as the denominator of the second preceding cycle, and, consequently the same as the next higher order of secondary spirals.

18. The number of cycles in a Pine cone may be indicated by prefixing a multiplier to the fraction expressing the cycle. This will also show approximately the number of scales in the cone. Thus the cycle and number of cycles in a cone of Hemlock Spruce (*Abies Canadensis* is represented by 2 (5-13). This also shows that the number

of scales in the cone is 2x13=26. The number of cycles in the cones of Black spruce (*Abies nigra*) vary from 4 to 7, averaging about 5. Hence its cycle and the number of cycles will be represented by 5 (5–13), and the number of scales by 5x13=65. In like manner the cone of White Pine (*Pinus Strobus*) is represented by 5 (5–13); of Pitch Pine (*Pinus rigidus*) by 4 (13–34); of American Larch (*Larix Americana*) by 2 (2–5), etc.

TABLE II.

C	I	II	III	IV	V	VI	VII
	1	2	3	5	8	13	21
0–1	0						
1–2	1						
1–3	1	1–2					
2–5	2	1–2	1–3				
3–8	3	1	1–3	1–5			
5–13	5	3–2	2–3	1–5	1–8		
8–21	8	5–2	1	2–5	1–8	1–13	
13–34	13	4	5–3	3–5	1–4	1–13	1–21

19. Table II exhibits the number of turns or parts of a turn made by each order of spirals in a single cycle. Or, the denominator shows the number of cycles required for the spirals to make the number of turns indicated by the numerator.

Opposite Leaves.—20. Opposite leaves also exhibit cycles of arrangement analogous to those of alternate leaves.

21. *The 0–2 Cycle.*—(Fig. 7.) The 0–2 cycle represents the two-leaved ancestor of all Dicotyledons; it yet stands for the cotyledonary leaves of many of them, the succeeding leaves being alternate. The 0–2 cycle, however, is not at all liable to the objection of being an ideal one. "*In many fossil plants the pairs of leaves do not alternate, but are placed directly one over the other.*" (Henfrey's Elementary Botany, p. 45.) Hence 0–2 represents a two-ranked arrangement of opposite leaves.

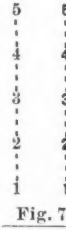


Fig. 7.

22. *The 1–4 Cycle.*—(Fig. 8.) In the case of opposite decussate leaves, the cycle is complete in two nodes. The leaves are borne upon two spirals, each of which makes half a turn round the stem. The cycle, therefore, is represented by 2(1–2)–2 (2)=1–4. This is the most common arrangement of opposite leaves. Examples are furnished by the Maple, and by plants of the Mint Order.

Fig. 8.

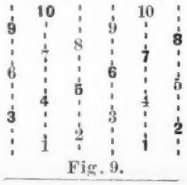


Fig. 9.

23. *The Higher Cycles.*—When the fourth pair of leaves stands directly over the first pair, three nodes complete the cycle and there are six ranks. There are two spirals each bearing three leaves in half a turn about the

stem. This cycle then is represented by 2 (1–2) –2 (3)= 1–6. (Fig. 9.) In like manner it may be shown that the next cycle, in which the 6th pair of leaves stands directly over the first pair, is represented by 2 (1)–2 (5)=2–10. And it will be found that the cycles of opposite leaves are represented by the series, 0–2, 1–4, 1–6, 2–10, 3–16, 5–26, 8–42, &c.

24. The following table exhibits the number and direction of all the orders of spirals belonging to each cycle of opposite leaves, as far as the 13–68 cycle.

TABLE III.

C	I	II	III	IV	V	VI	VII
0–2	0						
1–4	+2						
1–6	+2	–4					
2–10	+2	–4	+6				
3–16	+2	–4	+6	–10			
5–26	+2	–4	+6	–10	+16		
8–42	+2	–4	+6	–10	+16	–26	
13–68	+2	–4	+6	–10	+16	–26	+42

Fig. 10.

25. Exceptional cones of Pine and Fir are to be met with, which belong to the higher cycles of opposite leaves. Fig. 10 is a cone of Black Spruce, in which the cycle is 5–26. The cycle of such a cone is to be determined in the same way as one belonging to the alternate system (16.), except that in numbering the scales the common difference is found by taking half the number of spirals in each order. It will be found that two sets of numbers are necessary to mark all the scales of the cone.

26. In like manner cycles of verticillate leaves when there are three leaves at each node will fall into the series 0–3, 1–6, 1–9, 2–15, &c. When there are four leaves at each node the series will be 0–4, 1–8, 1–12, 2–20, &c.

TABLE IV.

	ORDERS OF SPIRALS.						
SYSTEM.	I	II	III	IV	V	VI	VII
(0–1, 1–2)	+1	–2	+3	–5	+8	–13	+21
(0–1, 1–3)	+1	–3	+4	–7	+11	–18	+29
(0–1, 1–4)	+1	–4	+5	–9	+14	–23	

27. There is authority for examples of cycles in systems other than the common one.

Table IV exhibits three systems of cycles and the number and direction of their different orders of

spirals. The laws (13, 14) that govern the common system apply equally to any other. The mode of finding the cycle from the secondary spirals (15, 16) is also the same as in the common system.

28. The phyllotaxis of the leaves is generally uniform in the same species. Thus in the Oak the leaves are always alternate; in the Maple, they are always opposite; and in *Galium* always whorled. The cycle of the cone of Hemlock Spruce is always 5–13. The direction of the spirals does not appear to be uniform in the same species, but, in some individuals the spiral winds to the right, and in others it winds to the left. In the same individual plant, the spiral usually pursues the same direction upon the branches as upon the stem.

FLOWERS AND SNOW.—This season of the year calls to mind some observations concerning flowers and snow in Colorado.

Among the first flowers of spring, those that must live and bloom through many snow storms, are *Townsendia sericea, Sisymbrium canescens, Cymopterus glomeratus* and *montanus, Viola Nuttallii, Leucocrinum, Corydalis, Thlaspi,* &c. Last year the *Townsendia* was in blossom as early as Feb. 14th, and *Phlox canescens*, with many other flowers, by the middle of March. A number of plants are in bloom in April and covered every year by the spring snows. In May I have seen *Cratægus coccinea* white with flowers made still whiter by the damp snow, with *Astragalus* and *Vicia* and very many other plants in full bloom buried beneath a foot of snow.

The spring snows do not seem to injure the plants or flowers in the least and many of them are benefited by the increase of moisture.

A snow storm in June is said to have covered all the dry parks with sunflowers, *H. petiolaris* and *lenticularis*. The alpine plants growing where there is a frost nearly every night in the year, must be well able to stand the cold. In July I once saw a *Trollius laxus* in blossom, growing out from a hole about one foot in diameter, in the center of a large snow drift. As the snow drifts disappear the plants rapidly grow and blossom. Some of the drifts melt away much sooner than others, and plants growing there are much in advance of those inhabiting the place of late melting snows. On Mt. Ouray, above timber line, there is a slope which, in August, is beautifully covered with the large golden flowered *Ranunculus adoneus*. On one portion from which the snow early melted, the plants are almost out of flower; at another part they are in their greatest perfection, and in other parts they are in their youth, closely following up the retreating snow drift.

Late one September, after snow had fallen twice, I made two or three excursions up among the high summits of the Sierra Sangre de Cristo, and was surprised to find a great number of plants in blossom in shaded locations and under rocks where the snow had not melted away early enough in the summer so as to give them a good start. They seemed bound to live their life out even if they did have a hard time of it and it took a longer time than all summer. *Primula Parryi*, frozen in blossom, was growing under cascades among ice-covered rocks. *Aquilegia cærulea* full of flowers, was standing in snow. *Adoxa, Gentiana frigida, Erigeron, Saxifraga* and many others were caught in full bloom by the Alpine winter. During some winters an extraordinary amount of snow falls and drifting among the high peaks, the following summer may not be long enough and warm enough to uncover the plants growing beneath, and they may not even begin to grow that year. After a winter of little snow and small drifts soon melted away by a warm summer, barren ground that may not have seen light upon it for years, is uncovered and an ancient drift has a wide border of flowerless ground.—T. S. Brandegee.

The Distribution of the North American Flora, by Sir J. D. Hooker.—In the *American Naturalist* for March there is a reprint of this lecture delivered by Sir J. D. Hooker last spring before the members of the Royal Institution of Great Britain. It will be remembered that the lecturer visited the United States during the summer of 1877, and in connection with Dr. Gray made a botanical cross-section of the continent, noting particularly the geographical distribution of plants. The regular report of this survey will appear in the forthcoming eleventh report of the U. S. Geol. and Geog. Survey of the Territories, and until that report is ready for distribution we will have to be satisfied with such casual information as the distinguished authors choose to give us.

The lecture begins by stating the fact of the immigration of plants from one continent to another, and then proceeds at once to a consideration of the physical conformation of America and the effect it has had upon the distribution of plants.

In the United States the lecturer observes five well defined meridional belts of vegetation, viz: the great eastern forest region, extending from the Atlantic to beyond the Mississippi; the prairie region; the Rocky Mountain region; the Sink region, remarkable for its display of sage-bush and saline plants; and the Sierra Nevada region with its gigantic coniferous forests. The first region is very closely

allied in its species to Eastern Asia, a fact brought out not only by a similarity in common species or large genera, but in very many cases by peculiar species and genera represented by two species only, one in Eastern America, the other in Eastern Asia. In Western America there is no such resemblance, making a greater difference between the floras of the eastern and western parts of the United States than between Eastern America and Eastern Asia. In the west there is a large commingling of Mexican or Southern species that have crept northward, guided by the mountain ranges. Hence the conclusion is arrived at that the similarity between the species of Eastern America and Eastern Asia is explained by the continuity of the continents to the north in the Cretaceous or Miocene and a consequent commingling of species, and that the Glacial period drove these species southward along the two continents farther even than they appear now. With the retreat of the glacier and the return of a milder climate these plants would creep northward again, but the enormous height of the Rocky Mountain and Sierra Nevada regions would retain the glaciers there long after they had disappeared from the eastern half of the continent. When eventually these alpine glaciers did succumb to a milder climate, the old Asiatico-American species having either established themselves elsewhere or been driven into the sea towards the south, the field would be clear for the advance of the Mexican forms and we find them even up in British America. Hence to state it all in one sentence, our Eastern flora has come from the North and our Western flora from the South.—J. M. C.

CAUCALIS ANTHERISCUS.—I have found thoroughly naturalized in the woods back of Cincinnati and remote from dwellings, *Caucalis Anthericus*. The name was kindly furnished by J. W. Congdon. Prof. Watson, to whom I sent a specimen, informs me that the plant was found in 1872 by Judge G. W. Clinton, near Buffalo, N. Y. It is firmly established in this locality and promises, I think, to become a troublesome weed.—C. G. LLOYD.

NOTE ON PANICUM LITTORALE, VASEY, BY GEN. WM. MUNRO.—PANICUM LITTORALE, Vasey, is undoubtedly *P. repens*, L.,—one specimen the dwarfish form which he described in the second edition of Sp. Plant. p. 87. It is absolutely identical with specimens which I have before me in DeCandolle's herbarium from Crete and Gibralter, where I have also collected it myself. It is also *P. arenarium*, Brotero.

There has always been considerable confusion about *P. repens*, L. The *P. repens* of Burman, Fl. Ind., p. 26, tab. 11, fig. 1 (1768), where

he quotes Linnæus, is quite different and, from the figure, is probably *P. prostratum*. At any rate it belongs to quite a different section of *Panicum* from true *P. repens*, L. However, many seem to have thought that this was the true *P. repens*, and therefore founded a new species under the name of *P. arenarium*. True *P. repens* can always be distinguished by the numerous nerves on the upper glumes and on the lower palea of the male flowers.

The specimen sent by Dr. Gray has quite glabrous vaginæ, whereas those received from Dr. Vasey have almost hirsute vaginæ.

RECENT PUBLICATIONS.—*American Naturalist*, March.—Besides Sir Joseph Hooker's lecture, referred to above, Mr. Fred. Brendel writes a spicy article "On Nomenclature," much of which is true and some of which is impracticable, however desirable it might be. Mr. Geo. E. Davenport, in advance of the publication of his Catalogue of N. Am. Ferns, gives his reasons for retaining Tuckerman's name *Aspidium Boottii* in place of *A. remotum* of Braun.

Journal of Botany, British and Foreign.—Sketch of the life of Elias Fries with portrait. He was born in the south of Sweden, Aug. 15, 1794, and died Feb. 8, 1878. Report on a collection of Ferns from Borneo, with description of new species by J. G. Baker. Notes on some points in Botanical nomenclature by Mr. Bentham. On the Vegetable remains in the Egyptian museum at Berlin, by Alexander Braun, edited from the author's manuscripts.

Catalogue of Plants collected by Dr. Coues in Dakota and Montana by Prof. J. W. Chickering.—This catalogue contains 692 species, of which about 390 are found in New York or New England, about 80 are distinctively Western in their habitat, and about 215 belong on the plains and the Rocky Mountain region.

Ferns of North America, by Prof. D. C. Eaton. Parts 12 and 13.—In looking over the plates of this number it seems to us that they are the finest that have yet been given to us. There is a freshness and distinctness about them that leaves little to be desired. The species figured and described are *Aspidium acrostichoides*, Swz., *Pteris aquilina*, L., *Asplenium Trichomanes*, L., *A. viride*, Hudson, *A. parvulum*, M. & G., *Adiantum Capillus-Veneris*, L., *A. emarginatum*, Hook., *Vittaria lineata*, Swz., *Notholæna sinuata*, Kaulf., *N. ferruginea*, Desv., and *N. Newberryi*, Eaton.

Bulletin of Torrey Botanical Club, December.—Dr. Gray has two notes, one upon the confusion of the names *Diclytra*, *Dielytra* and *Dicentra*, the other upon a sporting *Trillium grandiflorum*.

SOME NEW MUSCI, by C. F. Austin.—DICRANUM (CAMPYLOPUS) DONNELLII, n. sp. (*D. subleucogaster*, AUST. Exsic. Suppl. I, n. 470, non C. MULL.)—A *D. subleucogastri* differt; colore amœne fulvo-viridi, foliis magis apertis subfalcatis longius et magis subito attenuatis apice sæpe albicantibus spinuloso-serratis, costa angustiori laxiori, etc.

D. porphyrrodyction, MITT. proximum; differt tamen cellulis superioribus folii multum brevioribus (minutis quadrato–ovalibus), costa latiori multum longius excurrente apice magis serrata, etc.

Southern Florida, common. Associated with *D. gracilicaulis*, MITT. and at least three other species: among them is—

DICRANUM (CAMPYLOPUS) ANGUSTIRETIS, n. sp.?—Adspectu *C. gracilicauli* versimile, sed foliis inferioribus minus appressis cellulis multum longioribus (sublinearibus) alaribus rufo-purpureis tenuioribus valde constrictis, statim distinguitur.

LEPTOTRICHUM HOMOMALLUM (*Hedw.*) var.? EROSUM.—A forma normali differt; foliis eroso-serratis. Plantæ utriusque sexus in eodem cæspite: sterile. (An species distincta?)

Vancouver's Island, May, 1875, *Macoun*.

DICRANUM (CAMPYLOPUS) VIRGINICUM, n. sp.—Dioicum, sat dense lateque depresso-cæspitosum; cæspite læte fulvo-viridi, caule subintricato vix ultra unciam longo laxo flexuoso tenui subæqualiter laxe folioso juniori albido-tomentoso, foliis (apicalibus nonnullis exceptis) strictiusculis erecto-apertis a basi subquadrato-ovata raptim longe subulato-setaceis canaliculatis toto margine minute serratis, costa lata striata viridi inferne folii latitudinem 1-5 to 1-3 subulamque fere totam occupante dorso scabra vel apicem versus subserrata, cellulis ad basin et in medio versus eam permultis laxis hyalinis albidis oblongis et ovalibus cæteris plerumque rhomboido-oblongis linearibusve: foliis apicalibus nonnullis a basi angustiori truncata fragili deciduis magis convolutis multum longius sensim attenuatis toto margine integerrimis dorso lævissimis, cellulis brevioribus basiloribus hyalinis vix ullis, costa ægre a lamina distincta: cætera desunt.

Blackwater Falls, West Virginia, July 5, 1878, *Capt. J. Donnell Smith*.

Stems slender and scarcely exceeding an inch in length; the younger ones lightly clothed with a delicate entangled white tomentum. About one half of the expanded portion of the leaf is composed of large hyaline cells. Ascending along the costa these gradually become smaller and chlorophyllose, while towards the margin they rapidly become much narrower and longer. The basal cells, although much enlarged are not inflated. There appear to be no true alar

cells. The lamina rarely extends to the middle of the subulate portion of the leaf. A curious feature is the deciduous leaves above described. On account of the longer cells of the lamina it cannot be confounded with either *D. subleucogaster* or *D. Donnellii*.

CALYMPERES DONNELLII, n. sp.—Caule perbrevi gregario-cæspitoso; foliis flexuoso- et subrecurvo-patentibus (siccitate constrictis et magis patentibus) e basi angustata longe ligulatis obtusiuscule acutatis canaliculatis integerrimis opacis minime crebre papillosis angustissime incrassato-marginatis vel margine concolore nonnullo planis superioribus apice valde constrictis, costa concolori valida percurrente apice granulifera, cellulis minimis basilaribus per spatium magnum acutum amplis hyalinis: cætera desunt.

On trunks of trees, Caloosa, Florida, March, 1878, *J. D. S.* and *C. F. A.*; scarce.

Closely allied to *C. Richardi*, C. M. (AUST. Exsic. Suppl. I.); but readily distinguished by the leaves being flexuose-patent when dry; they are also nearly twice as long, more opake and more minutely areolated—the contracted granuliferous apex of the upper leaves about half as broad, but usually much longer; the hyaline portion at the base is composed of notably smaller cells, and is of a different shape—the dividing line between it and the opake portion passing very obliquely upward from near the margin to the costa (much as in *C. disciforme*). Remarkable for the most minute ordinary leaf-cells, and for the leaves being widely spreading when dry.

C. disciforme, C. MULL with the upper leaves very broad and bearing filaments on the costa was also found sparingly on the Caloosa; also *C.? crispus*, AUST. Bot. Gazette, II, p. 109 (*Syrrhopodon?*).

There are indications of another new *Calymperes* from Caloosa, Fla.; differing from *C. disciforme* in much narrower leaves, with filaments borne on the costa from middle to apex. I have named it provisionally, *Calymperes filigera*.

FISSIDENS DONNELLII, n. sp.—Dioicus, minutulus; foliis 3–4-jugis immarginatis papillosis margine crenulato-serratis inferioribus oblongo-ovatis cæteris multo majoribus lanceolato-linealibus, duplicatura ad medium producta, costa sub apice finiente, cellulis perminutis papilla unica obtectis; pedicello perbrevi, capsulis destructis.

On the base of trees in a cypress swamp, Caloosa, Florida. March, 1878, *J. D. S.* and *C. F. A.*

This species is characterized by the papillose and crenulate immarginate leaves, consisting of but 3 or 4 pairs,—the upper ones considerably elongated. The male and female plants grow together. Un-

doubtedly it is closely related to *F. subcrenatus*, SCHIMP.; but that is said to have 5 or 6 pairs of *lanceolate* leaves.

F. Garberi, JAMES, ined.—another very small species with more numerous immarginate leaves was found on rotten wood and shells, on the Indian River, in 1877, by Capt. Smith. It also occurs sparingly in Southwest Florida.

The following species have also been found in Florida: *F. Ravenelii*, *F. incurvus* (vere), *F. subbasilaris*, *F. decipiens*, *F. taxifolius*, *F. adiantoides*, *Conomitrium Julianum* and *C. Hallianum*. The last two on the under side of floating logs in cypress swamps.

BRYUM (CLADODIUM) FLEXUOSUM, n. sp.—Caule laxe cæspitoso brevi innovante erecto, foliis pallide rubris erectis ovatis subconcavis acutis, margine plano vel demum recurvo integerrimo, costa valida percurrente vel excurrente, capsula in pedicello 1½–2 unciali tenui flexuoso pallide rubro obovato-oblonga pallida subhorizontali, operculo majusculo depresso conico minute mammillato, peristomi interni cum externi adhærente, ciliolis nullis: dioca? flore masc. terminali majusculo bartramiduloideo.

On gravelly ground, Blackwater River, British Columbia, Macoun, (1875).

Readily distinguished by the short reddish stems, long flexuose pedicel and pale oblongish capsule *not tapering at the base.*

NECKERA (PILOTRICHUM?) FLORIDANA, n. sp.?—Caule primario repente radiculoso innovandi-ramoso submicrophyllo, foliis ovato-lanceolatis acuminatis ecostatis lævibus margine planis, secundario compressiusculo (vel siccitate teretiusculo) erecto (vel pendulo?) stricto vel curvulo simplici vel parce ramuloso apice obtusiusculo nonnunquam stelloideo, foliis erecto-apertis imbricatis anguste oblongo-lanceolatis profunde canaliculatis vel cymbiforme-excavatis sensim acutatis supra medium plicato-striatis utrimque minutissime subobsoleteve papillosis margine late revolutis integerrimis obsoletissimeve serrulatis pro more supra medium leviter simpliciter costatis, cellulis minutissimis lineari-fusiformibus fere rectis basilaribus paulo latioribus quadratis subseriatis granulosis ad angulos spatium magnum distinctum formantis: cætera desunt.

On trees, Caloosa, Florida, March, 1878, *J. D. S.* and *C. F. A.*

Leaves usually with a plica near the margin at the base, or often extending to near the apex; costa very light and usually extending a little way above the middle. Possibly a *Meteorium*.